

INTRODUCTION: HOMAGE À WALTER FREEMAN III

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We announced FOM 3 as follows;

FOUNDATIONS OF MIND III

Reparsing Nature: Science as if Being Mattered

This conference explores the issue of whether a “Being first!” approach will not yield a better, more veridical science. It asks the attendees to consider whether there are not different types of causal explanation at each level of nature including occasionally none at the quantum level, teleology in biology, and that nexus we invoke to explain each other termed “folk psychology” at the intentional/intersubjective level. While we began our project with the insight that reduction of mind to current theories of psychology has always been what Frege dubbed “psychologism,” we now extend the argument.

In particular, we argue that \$ billions are being lost in inefficient, often unethical “science” research whose lack of attention to ontology makes it doomed to failure. The premature application of this to human affairs, be it drugs that do not take account of the intricate interplay of genes and metabolism, meditation “techniques” that do not take account of 21st century Being-in-the-world, or simplistic accounts of how politics are processed in the brain, are engineered for failure. Conversely, appropriate use of robust dynamical systems techniques have already proven insightful and low-cost in neuroscience and elsewhere; constraining the search space by using syntax is already being used in genomics; homoiconic programming languages model DNA well; and so on.

While its mythic poverty IS necessarily an ultimate constraint on science, as distinct from the equally valid exploration of reality in the arts, much can be done to improve scientific education and research. As things stand, physicists search for a theory of everything that makes other sciences redundant, Cognitivists implore us to

couch our theories in the cognitive schemata they see as fundamental; neuroscientists up the ante on greedy reductionism by asserting the primacy of their findings - be they genetic, algorithmic or chaotic - over all other Sciences.

Several alternatives are also gaining traction. One, that of non-dualism, refuses to budge from the inalienable fact of the primacy of conscious experience. Another, that of class warfare, surely due a comeback as the 2016 Democratic race shows, argues for the bourgeois nature of such speculation. Finally, an eschatological attempt to roll science, society, and culture into One Magisterium/Caliphate now brutally occupies vast swathes of the Middle East.

This conference is a search for alternatives. The premise underpinning this conference, a premise with which participants should feel free to disagree, is that once one has moved beyond solipsism/non-dualism, there now exists the possibility of a dramatic reprieve of nature. Papers are invited which address these and other themes;

1. Theories of everything (TOEs); in what sense would a set of equations comprehensible only to an extreme minority comprise a TOE to be taught as Hawking recommends to schoolchildren?
2. Information; is the quantum information described by Bousso the same thing/process as Susskind's "entropy", information in Shannon, the deus ex machina that generates the universe of Seth Lloyd and the correlates in the biological work of Deacon and Tononi?
3. Computation; in the 1990's, Brian Smith argued that it was impossible to isolate a computational system to allow it perform algorithms and simultaneously to align it with the real world on which it was operating. In order to achieve "Computation in the wild", he argued, it was necessary to identify computational systems as pure intentionality in the Brentano sense, precisely the position that the Chinese room thought-experiment rejects. Can we rescue the concept in a way that does justice to all its manifestations from the quantum and classical Fourier transforms to using a spreadsheet?
4. The psychological/intentional realm; Advaita Vedanta was brought into the West partly, if not largely, by George Harrison's invocation of a transcendent reality "within you, without you." Contrariwise, Gurdjieff's fragment of a system, as expounded by Ouspensky, is full of clunky mechanical metaphors for the human psyche, the amoeba and indeed the Absolute. Can we do better than this in the face of the spectacular and burgeoning success of 21st century AI and robotics, and the dismal failure of psychology?

5. Science's dark period: "Dark energy" and "dark matter" are too well-known to be rehearsed here, and are suggestive of a stage of crisis in science, but are mirrored in other areas. Examples are the fact that the "dark energy"/default network of the brain is currently suggested as absorbing metabolic process even when no cognition is taking place; linear models of the neuron are clearly too simple; the "dark nucleotides" result in non-coding rmas that actually code by any computing definition; and so on.

6. Quantum mind; Internal FOM private discussion has benefitted from the input of the great Henry Stapp. Publicly, Henry has recently stated that the Orch OR model would generate creatures that would become conscious with no memory and thus no cognition. Yet he considers the Gödel incompleteness argument sound, with the proviso that its is the unfolding of the cosmos that is implicated in humans' ability to "see" the truth of the Gödel sentence. This is of course compatible with the pre-Hameroff Penrose, and may be the start of a fusion of computationalist cognitive science and physics in a suitably extended notion of observer status. That in turn through the frames of reference argument in SR would give us a route into a treatment of selfhood compatible with science. Can we follow the path blazed by this physicist and mathematician to a formal theory?

7. Consciousness; there is a remarkable consensus that this has not yet been solved. Yet, in the rush to "solve" the "hard problem" with gazebos like Terahertz oscillations and a word salad of half-understood biology, many useful concepts have been lost and we welcome papers on them. Examples are; the Locke/Leibniz debate on the relation between subjective state and neural event; Levine's explanatory gap; Block's a- and p -; Marxist class consciousness and its relation to emanationist systems; neural synchrony; Pribram's Gabor transform; Global workspace theories; Crick's comment that he came into the area 20 years too early for the neuroscience and his resulting *idée fixe* about a neural correlate in a specific location.

8. Neuroscience; as predicted in FOM, the Markram/EC project has become a debacle. What are the technical and organizational desiderata to prevent a recurrence in the USA?

9. Activism; In what increasingly looks like a fragile pause in hostilities, the neoconservative "shock doctrine" has given way to a neoliberalism that exploits distracters like gender or an African-American president. How long can this last in an era which has seen major terrorist attacks in the EU?

10. The academy; we tend to forget that the academy is meant to produce truths to

be acted on. Instead, just as the state rescued an extreme version of financialized capitalism post-2008, neglecting to pursue thousands of criminals, so the academy sees its role as providing drones for an ever more economized life. At the elite level, may post-docs find themselves 30, \$100k + in debt, and with career prospects the same as if they had never gone to elementary school, let alone college. How long can this last in an era where all necessary research and educational resources are free on the web, and it is clear to the lab drones that most PI's are hopelessly out of date?

11. Science set free; famously, Rupert Sheldrake has invoked "morphic fields" to explain everything from crystallization to biological morphology. Can this be extended to the human level to explain simultaneous discovery like non-Euclidean geometry in Lobachevski, Bolyai and Gauss as well as the more famous Newton/Leibniz bother? What entities might carry these "Nuons" and what are the implications for ESP and indeed all conversation?

PANEL: THE NATURE OF CONSCIOUSNESS

Chair: Dr. Menas Kafatos

There is a remarkable consensus that the nature of consciousness has not yet been solved, and what constitutes different experiences or qualia remain challenges hardly addressed in mainstream science. Yet, in the rush to "solve" the "hard problem" with physical solutions including oscillations, networks, and not-well-understood applications of biology, many useful concepts that are integrative, mathematical, philosophical concepts that extend physical or sociological theories have been lost.

Rather than finding "the" Theory of Consciousness, it is best to allow interdisciplinary dialogue, seeking common elements across different fields, seeking to integrate. In this session, we welcome papers on them.

Possible topics (but not limited to these) are:

- The relationship between subjective state and neural event; the explanatory gap
- Neural correlates and subjective experiences
- Philosophical considerations
- Quantum mechanics and the role of the mind
- Subjectivity and objectivity
- Mind and non-locality
- Evolution and physical structures
- Primacy and universality of consciousness

- Gabor transforms
- Mathematical approaches to consciousness

PANEL: PSYCHOLOGY: NEURODYNAMICS & ECOPSYCHOLOGY: THE LEGACY OF PRIBRAM AND FREEMAN

Sproul Room, International House, UC Berkeley

Chair: Seán Ó Nualláin

In January 2015 and April 2016, respectively, Karl Pribram and his student, Walter Freeman, two of the greatest neuroscientists in history, were lost to the world. Both had appeared at our conferences, in Ireland and the US, again respectively; we were privileged to write computer code simulating their views of brain and mind, code that they considered invaluable. Both stressed a view of brain and mind wildly at variance with the current neo-phrenology suggested by fMRI, a view which transitions between states in a vector field was the fundamental level of analysis, and in which chaotic attractors, as well as other dynamical systems concepts, were essential.

They differed in interesting ways. Karl Pribram focused on the “microscopic” neural level, particularly on dendro-dendritic connections between individual neurons, and argued that neurons could self-assemble into structures capable of performing Fourier and Gabor transforms. Indeed, in company with David Bohm, Pribram went further still, arguing that such noetic brain processes could be considered as rendering “explicate” and thus available to our cognition a transcendent implicate Reality.

Walter Freeman differed in his emphasis on “the mesoscopic” neural level, ensembles of 10k or so neurons, and provided an entirely new vocabulary involving phase transitions to explain neural behavior. Moreover, unlike Pribram, he did not make any commitment to epistemological Realism; it was sufficient for communication that neural synchrony could be established between two people, an insight he may have been led to by his love of dance. Pribram would not have objected to this synchrony, but was happy to identify it with microprocesses at the dendritic level.

The issue to what extent we are psychologically embedded in nature can be re-examined in the context created by these contrasting theorists.

PANEL: THE OBSERVER INCLUSIVE PHYSICS

Sproul Room, International House, UC Berkeley

Chair: Dr. Wolfgang Baer

The Observer Model, used for the interpretation of experimental results that underpin our physical theories, influences the very theories we believe to be supported by their

objective observation. Many of the foundations of physics are based upon Observer Models that vary from (1) not included, to (2) objective eyewitness, to (3) quantum observer, and on to (4) more advanced models, in decreasing frequency of application. The presentation for this session will address three main issues:

1. Defining the physics of an observer designed to interpret measurement results
2. Testing and validating foundational premises of physical theory when an observer is included in the theory
3. Identifying and correcting, or flagging for correction, areas of accepted physical theory that contain observer-dependent inconsistencies

Suggestions for specific presentations/papers include (but are not limited to):

1. A review and evaluation of Observer Models
2. Review, evaluate, and identify a set of Foundational Experiments that have a major impact on the formulation and adoption of physical theories. A partial list of foundational experiments would include:
 - the double slit experiment
 - the Michelson-Morley experiment
 - the Bell's Theorem Violation experiments
 - the light-bending, red-shift measurement experiments
 - Hadron Collider experiments
 - 3-degree black body background radiation experiments
3. Applications of Observer Models in the interpretation phase of foundational experiments in order to validate the physical theories explaining the results
4. Discussion of the impact of corrections identified by observer-included analysis, and corrections to the theory where possible.

The central issue to be explored relates to what might be called the “rose-colored glasses” effect or Sir Eddington’s Fish Story, which notes that observer characteristics may be inadvertently assigned to the systems being observed. If Eddington’s conjecture is applicable, the most fundamental properties of nature will turn out to be the construction rules of the observer who measures nature. Since the human observer is the final measuring instrument, which collapses the wave function at the end of Von Neumann’s measurement chain, and no one knows exactly how the human brain works, it is possible that consistent observer characteristics have been introduced and falsely attributed to the systems being investigated. This certainly happened when classic physics conceived of physical reality as a 3D objective universe, because people believed in “naïve reality,” i.e., that the world is essentially as we see it. Consequently,

people built classic theories consistent with the “naïve reality” assumption until quantum theory showed this to be in error. If a false projection of an observer characteristic can be identified, not only will a specific field of study be affected, but a new paradigm of an observer-inclusive physics will emerge.

PANEL: BIOLOGY: THE WORK OF PROF. PETER DUESBERG ON ANEUPLOIDY IN CANCER

Sproul Room, International House, UC Berkeley

Chair: Dr. Beverly Rubik (PhD, UC Berkeley)

Keynote: Prof. Peter Duesberg, “Is carcinogenesis a form of speciation?”

In March 2016 at UC Berkeley, Ira Mellman of Genentech described the received vision of cancer causation as the “oncogene-industrial complex.” It was not intended as a compliment; rather, the context was a pitch from the immunology community for the \$1 billion money allocated to Vice President Joe Biden’s “cancer moonshot.”

Peter Duesberg, it is fair to say, achieved notoriety for correctly pointing out that received versions of the mechanism for HIV causing AIDS were incomplete. Similarly, after a Pauline conversion from pioneer work in oncogenes, Peter has argued that cancer involves aneuploidy — dysmorphia at the chromosomal level — rather than simple oncogenes. Of course, the fact that “Gulf War Syndrome” is aneuploidy in excelsis means there could be a multi-billion-dollar payout if this becomes conventional wisdom. Peter will speak about his research in this field.

If Peter is correct, and the community is now showing momentum in his direction, current discussions about cancer — including the recent Cal event — are analogous to discussing blood circulation problems without mentioning heart disease, or diabetes absent insulin.

Cynthia Sue Larson as ever has written a fine description of the conference; <https://cynthiasuelarson.wordpress.com/2016/05/27/foundations-of-mind-iii-conference-science-as-if-being-mattered/>

INTRODUCING FOM: WHO WE ARE AND WHAT WE DO

We are neuroscientists, physicists, philosophers, linguists, anthropologists and psychologists from ages 20 to 90. We include Cal juniors, Nobel laureates and social activists. We are secular, with a membership including all ethnicities, the LGBTQ community - and we even have a Gaelic-speaking (lapsed) Irish Catholic!!

We publish prolifically - at a rate substantially greater in peer-reviewed outlets than any cog sci dept. Moreover, we allow writers to hold their copyright without

payment, nor do we charge for public access. We have published articles by Stu Kauffman, our mentors Walter Freeman and Henry Stapp, Jacob Needleman, and many others; the quality is second to none. Our conferences and seminars have so far taken place at UC Berkeley.

OUR VIEW OF CONSCIOUSNESS

While a definition of consciousness may or may not be helpful, it is possible to identify signatures at the neural, informational, metabolic and phenomenal levels that distinguish conscious states from dreams on the one hand and from intermediate waking states on the other. At the neural level, conscious states are characterized by gamma phase synchrony over an appreciable amount of time, from fractions of seconds upward. At the informational level, conscious states involve modulation of the gamma wave broadcast over the whole cortex which constitutes the "content" presented to the subject. If that content is minimal, the conscious state may be called "meditation" and may last up to hours.

At the metabolic level, power consumption by the brain dips due to the superposition of the gamma on the white noise constituting random neural firing. At the phenomenal level, unlike dreams, conscious content is consistent. Moreover, this consistency does not apply to normal waking states, when narration to oneself may be fallacious,

More speculatively, it may be possible to identify signatures at the quantum level, and to identify biological substrates like microtubules which can sustain quantum coherent states at physiological temperatures. That task will comprise the life's work of many of the 21st century's finest minds.

Our new proceedings have a solution to the "hard problem" in terms of the W. Hoffman relativistic argument and Freeman's 70 years of neural data. Basically, if cognition is self-centered in relativistic terms, science has admitted a self. If, as Freeman argues, representation after pre-cortical levels like the olfactory bulb is wholly idiosyncratic to that animal's experience, it is inevitable a unique "self" will emerge. We can go on to say that conscious experience allows that self merge with intentionality, giving a moment of awareness

THE PHYSICS OF CONSCIOUSNESS?

Aristotle's books famously were ordered (or, perhaps taught) such that the more speculative ones were after physics i.e. meta-physics; early Aristotelian scholars called those books τὰ μετὰ τὰ φυσικὰ βιβλία, *ta meta ta physika biblia*, which means "the books that come after the (books about) physics." It is normal to define physics as "the

natural science that involves the study of matter and its motion through space and time, along with related concepts such as energy and force” (Wikipedia Sept 26 2016). When physics engages with consciousness in this definition, which we will use as a working model, it becomes metaphysics.

In my desperate search for suitably authoritative sources, I of course tried Dr Cooper;

<https://www.youtube.com/watch?v=AEIn3T6nDAo>

Correctly, Sheldon points out “physics” (defined from 1'20” or so) originally denoted the study of nature as a whole. That is not what is currently taught as physics, which is closer to the wiki definition.

The paradigmatic example of an inappropriate claim-jump by physicists is of course Hawking’s insistence that a universe without an origin will “just be”. At that point he has ventured into ontology. Moreover, to engage with consciousness physicists have to bypass the biological sphere, one that has its own manner of causal explanation, and involves syntax and semantics.

Yet physicists are not wasting their time. As the fortune cookie points out, were the brain simple enough for us to understand, we would be too simple to understand it. What physicists can do is to delineate in the most veridical and elliptical way possible what intentionality is in human beings; that is, how we construe a world considered as external.

In this collection, we will find a convergence between Hoffman, looking at the brain from the inside, and those like Sarfatti and Josephson, who believe that they have found a way to encompass biology. In particular, there is an emphasis on two math physics techniques; Hilbert spaces and fibre bundles. Sarfatti insists that these have alchemist’s stone properties; skeptics like Zielinski argue they are simply math tools (All personal communications through the FOM list).

We will see that the use of (non-complex) Hilbert spaces leads to a view in which psi, the wave function, is said to correspond to the objective and its complex conjugate to the subjective. Ultimate reality is considered Uroboros, beyond subject and object; this will be familiar to Vedantins. Using the fibre bundle (following Hoffman, I use the British spelling) paradigm, we find that followers of Bohm’s post quantum theory argue for a recursive scheme, with the ultimate pilot wave itself having qualia.

Is either of these right? Which is least wrong? Along the way, we have arrived at the requirements for the formation of a new neuroscience that can reflect intentionality; we also have the physics tools to describe real brain function. The viewpoint taken here is that Uroboros is indeed fundamental; the pilot wave does not have qualia. These emerge for the first time when Uroboros has emanated a

representational system with a power greater than standard arithmetic (that would be us).

In an attempt to cater for multiple views of mind, FOM has over the past 3 years published notions off the beaten track. I wish to motivate three papers here. The notion that the brain resembles a crystal in any way sounds almost like a parody of new age. However, there is some hope; in 1940's Dublin Schrödinger published "What is life" which correctly predicted, well before Watson/Crick, that the basic genetic material would be a (periodic) crystal. Yet this fractal self-similarity is explored both by me and Dr Kaboli in our different ways. My experimental paper here shares with Dr Wolf an exploration of Platonic forms underlying both cognition and world-making.

At that point, my first paper here argues for a schema in which holographic representation of reality, reparsed according to our embodied being, allows nature to know itself through us. Moreover, given neurodynamics constraints, such knowledge is necessarily conscious.

FOM STATEMENT ON BIOLOGY

The FOM conferences and its predecessor Stanford and UC Berkley for-credit courses featured some of the world's greatest biologists -Stuart Kauffman, Richard Strohman, Walter Bortz, and others. They argue that current biology and the biomedical model it inspires is wrong, and much human suffering is caused as a result.

For a start, current biology is based on Crick's central dogma; dna makes rna make proteins makes the phenotype with no back-action. Retroviruses like HIV were the first successful heresy; it is now true to say that widespread acceptance of epigenetics has condemned this dogma, like all other such, to the dustbin of history.

For FOM, in its incarnation as "bionoetics", the focus of study of biology should be the organism, species, population in the ecosystem, and ecosystem itself over time. In that complex, functions emerge which may eventually be assimilated to the genome. In that case, we can use genomics techniques to tease them out in the DNA; unfortunately, such techniques are currently too simple. Our course in biosemiotics, the third such in the world and taught for credit at Stanford, introduces the symbolic element necessary.

That course also emphasizes, following Strohman, that metabolic pathways are ancient indeed, and may ignore or recruit gene expression. As this great Berkeley biologist also pointed out, most diseases are epistatic; perhaps 2% of diseases result from a single" gene" causing a pathology.

The result is an emphasis on preventative versus curative medicine, and a reminder that maintaining a healthy weight requires access to one's metabolic being. That in turn involves exercise, eschewing foods causing diabetes/metabolic syndrome and much else. While that is simplicity itself, we have much to say on how genomics techniques can be improved, and how meditation can help health.

The central issue is mechanism and we have developed techniques to measure the metabolic consumption by the brain, and its dips in consciousness and that extended form of consciousness called meditation. More to the point, our QM work may reveal how this process becomes susceptible to voluntary control. The process by which NAD⁺ is converted to NADH is endothermic, and requires either quantum tunneling or an access of metabolic energy freed up by the brain. It is of course akin to photosynthesis, which has attested quantum correlates.

In addition to biosemiotics, we also have worked at Stanford on developing systems that enable the physically challenged as real as more valid neural models.

THE PASSING OF WALTER FREEMAN

Yet much more importantly we lost our mentor Dr Freeman this year and I wish to spend the rest of this introduction on him. Walter Jackson Freeman, who passed away in April 2016, was almost certainly the world's only third generation neuroscientist. This writer adds a personal note on his ancestry below; for the moment it is appropriate to point out his intellectual pedigree.

Among other things, Walter was a medical doctor, with interests in philosophy and poetry, in electronic engineering (gained during his military service in WW2), and a consummate biologist. In conjunction with his mentor Karl Pribram, he remained unseduced by facile analogies between digital and neural circuitry and asked much more profound questions. What is the correct level of analysis of neural function. – McCullough – Pitts type logic circuits or vector fields? How does the brain's fantastically dense interconnection form its processing? How is consciousness reflected in the ebb and flow of power consumption of the brain?

One prominent definition of tragedy is that the hero is brought down by his virtues. It is incorrect to label such a full life as tragic, but the combination in his old age, of a car accident, near –blindness and incomprehension by the academic world of the scale of his achievement led to much isolation.

Eventually, he stopped applying for research grants altogether, preferring to wait for researchers to volunteer at his lab. I was one such; while he was not easy to work for, this writer learned more in 3 months that a normal three years. The intensity of

Walter's mind into his ninth decade is reflected by a rate of publication equalled only by his Stanford contemporary Pat Suppes.

Yet there is another facet to this father of seven children. Many of us at FOM 2 recall him arriving early at the reception to chat with Fiachra, the Irish piper, almost 7 decades his junior. It turns out there was a degree of atavism; not only were the Freeman II and III doctors, but Walter was also a Cassidy in his ancestry. This family were hereditary medical doctors in medieval Ireland. And so, again as was the case with Pat Suppes, it is left to this writer to fulfill the rite of Gaelic farewell, simply by saying his name.

Walter Jackson Freeman 1927 -2016

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